CLAIMS

What is claimed is:

1. A method for preventing a photo-induced chemical attack on a copper containing dielectric material comprising the steps of:

providing a copper or copper oxide containing dielectric material having an exposed copper containing surface;

providing an acidic cleaning solution for contacting the exposed copper containing surface; and

shielding the exposed copper containing surface to substantially block incident light from impacting the exposed copper containing surface while contacting the exposed copper containing surface with the cleaning solution.

2. The method of claim 1, wherein the copper containing substrate includes a semiconductor substrate having copper filled metal interconnects.

3. The method of claim 1, wherein the incident light source has a wavelength of between about 300 nanometers and about 800 nanometers.

4. The method of claim 1, wherein the acidic cleaning solution has a pH of between about 3.0 to about 4.5.

5. The method of claim 2, wherein the step of shielding is performed during a post-CMP cleaning process.

6. The method of claim 5, wherein the post-CMP cleaning process includes contacting the substrate with the cleaning solution according to at least one of a dipping process, a brushing process, and megasonic cleaning process.

7. The method of claim 6, wherein the post CMP cleaning process is automated for processing a substrate through a plurality of cleaning stations.

8. The method of claim 1, wherein the step of shielding includes placing a light blocking means between the incident light and the copper containing substrate to include the cleaning solution contacting the copper containing substrate.

9. The method of claim 7 wherein the step of shielding includes placing a light blocking means to at least partially surround each of the plurality of cleaning stations.

10. A method for preventing photo-induced chemical attack of a cleaning solution on a copper containing dielectric layer in a semiconductor wafer comprising the steps of:

providing a copper containing semiconductor wafer having an exposed surface including a copper containing dielectric layer;

providing a cleaning solution for contacting the copper containing dielectric layer; and

shielding the cleaning solution and the copper containing dielectric layer to substantially block incident light while contacting the copper containing dielectric layer with the cleaning solution.

11. The method of claim 10, wherein the copper containing dielectric layer includes copper filled metal interconnects.

12. The method of claim 10, wherein the incident light has a wavelength of between about 300 nanometers and about 800 nanometers.

13. The method of claim 10, wherein the cleaning solution is acidic.

14. The method of claim 13, wherein the cleaning solution has a pH of between about 3.0 to about 4.5.

15. The method of claim 10, wherein the step of shielding is performed during a cleaning process following a chemical mechanical polishing (CMP) process.

16. The method of claim 15, wherein the cleaning process includes contacting the substrate with the cleaning solution according to at least one of a dipping process, a brushing process, and a megasonic cleaning process.

17. The method of claim 16, wherein the cleaning process includes an automated process for processing the substrate at a plurality of cleaning stations.

18. The method of claim 16, wherein the step of shielding includes placing a light blocking means between the incident light and the cleaning process.

19. The method of claim 18, wherein placing a light blocking means includes placing a light blocking means to at least partially surround the cleaning process.

20. The method of claim 17 wherein the step of shielding includes placing a light blocking means to at least partially surround each of the plurality of cleaning stations.